

## **REMARKS**

### **I. INTRODUCTION**

Applicants have reviewed and considered the Final Office Action dated March 16, 2007 and the new references cited therewith. Applicants note that claims 1-5 are pending in the current application. Applicants respectfully request reconsideration of the above identified application in view of the remarks that follow. The amendments and remarks place the claims in an allowable form and, in the alternative, in better form for appeal.

Applicant acknowledges approval of the abstract provided with the amendment of January 29, 2007. Applicant further acknowledges Examiner's approval of the drawings, but the drawings have been cancelled.

### **II. SPECIFICATION OBJECTIONS - 35 U.S.C. § 132(a)**

The Examiner objects to the specification, stating the amendment filed January 29, 2007 introduces new matter into the disclosure. The Examiner requests Applicant to cancel the new matter. While it is not believed the subject matter in question constitutes new matter, in the interest of expediting prosecution, the matter in question has been removed.

The disclosure is objected to because of informalities, namely, no reference to Figure 5 is provided in the "Description of the Invention". Figure 5 has been cancelled rendering the objection moot.

### **III. CLAIM REJECTIONS - 35 U.S.C. § 103**

Claim 1 is rejected under 35 U.S.C. § 103(a) as being unpatentable over Rallis in view of Japan '213. Claim 1 has been amended to overcome this rejection. Regarding claim 1, and new

claims 2-5, neither Rallis nor Japan '213 disclose that the coating be plastic, i.e. achieve a Mandrel test of 10 mm, as shown in Table 1 of the specification. Furthermore, with regards to claim 1, Rallis specifically requires that "the ferrous tool is strengthened by a heat treating process consisting of heating the tool to a temperature above 1341 F. to within the austenitizing temperature range of the carbon or alloy steel..." (Col. 2 lines 18-21). Japan '213 does not disclose any process, but only an aluminum alloy, and so does not disclose this limitation.

Claim 1 is rejected under 35 U.S.C. § 103(a) as being unpatentable over Gierrek et al. in view of Rallis and Japan '213. Claim 1 has been amended to overcome this rejection. It is noted that, as described above, Rallis does not disclose that the coating be plastic, i.e. achieve a Mandrel test of 10 mm, or that the product be coated without preheating to within austenitic temperatures. It is further noted that Gierrek and Japan also fail to disclose that the coating be plastic, or recognize that it is plastic.

Primary features of the present invention are violated or go unrecognized by the cited prior art. These features include providing a method for a low temperature (under 715°C) melt to apply a plastic aluminum coating to iron and steel products, whereby the aluminum coating achieves a Mandrel test of 10 mm. The temperature range, alloy materials, and mass percent ranges are narrow in nature in order to specifically provide for these results. Furthermore, the problem solved by the current invention, that of brittle aluminum coatings, goes unrecognized by the cited prior art or is noted but worked around, as is the case of Rallis, rather than solved. Also, when the temperature of the melt leaves the bounds of the current invention, this plasticity of the coating decays. The temperature ranges of Rallis and Gierrek do not enable this narrow temperature range which allows for plasticity in the coating.

Regarding Rallis, the primary object of Rallis is to maintain high yield strength in a steel tool through the aluminizing process. Rallis is not directed at solving the problem of brittle aluminum coatings. Rallis recognizes the problem of the brittle nature of aluminum coatings and avoids the problem rather than solving it. Rallis teaches to do the heat strengthening prior to the application of the aluminum coating (col. 2 lines 18-33, col. 5 lines 32-34) because the "intermetallic layer is extremely hard and brittle and will respond to rapid changes in temperature by cracking" (col. 5 lines 34-36). Rallis optimizes the temperature of the melt, not to provide plasticity in the aluminum coating, but to maintain the yield strength of the steel tool. Rallis is directed at a different problem, avoids solving the problem addressed by the present invention, and fails to recognize the benefits of a low melt temperature, or disclose the select combination of materials for the alloy, or the narrow range of mass percentages used for the alloy.

The fact that Rallis discloses an alloy which may include the alloy metals of the current invention is not surprising considering that Rallis discloses hundreds of thousands of possible alloy combinations. It is surprising to assume that it would be obvious to optimize the nearly 200°C temperature range and hundreds of thousands of possible alloy combinations of Rallis to a narrow 20°C temperature range, a select four alloy materials, with mass percent ranges not disclosed by Rallis, to solve a problem Rallis recognizes, but acknowledges his process does not solve.

Regarding Gierrek, it is first noted that, contrary to the Examiner's interpretation, Gierrek does not disclose "an aluminum alloy that can contain aluminum and alloying metal such as zinc, silicon, magnesium and tin." (p. 9 Office Action) Rather, Gierrek discloses an aluminum alloy that can contain aluminum and a single alloying metal such as zinc, silicon, magnesium or tin. "The aluminum alloy may be those with a metal such as Li, Na, Si, Pb, Cu, Sn, Cr, Ni, Fe, Cd,

Mg, Bi, Be, Ag, Ca, Co, In, Mn, Sb, Se, Te, Zr, Ti." (Col. 2 Lines 50-52). Gierrek is limited to a single alloying metal.

Furthermore, Gierrek is directed towards "simultaneously heat treating and aluminizing... ferrous alloy products." (Col. 1 Lines 14-15) Gierrek is not directed towards, nor recognizes the problem of, brittle aluminum coatings. For this reason, it would be unlikely that someone skilled in the art looking to create a plastic aluminum layer would look to Gierrek. It is further noted that a feature of the present invention is that the aluminum coating can be applied with melt temperatures under 715°C. Gierrek is not attempting to accomplish this, which is apparent by the disclosed temperature range which spans a range of 400 degrees, with upper bounds 270°C higher than the upper temperature bound of the present invention. This temperature range does not provide for a plastic coating. It is difficult to imagine that Gierrek appreciates the advantages of a narrow aspect of this temperature range with an alloy not possible in its disclosure for a problem Gierrek does not recognize. It is more difficult to imagine that Gierrek would be combined with Rallis to solve a problem Gierrek does not recognize, Rallis admits to not solving, and which neither one of them have narrow enough temperature ranges to provide for.

Regarding Japan '213, although Japan '213 discloses mass percent ranges which overlap or include the ranges of the present invention, Japan '213 does not recognize or profess to solve the problem addressed by the current invention. While Japan '213 discloses a coating which provides corrosion resistance, it makes no mention of increased plasticity. The ranges of Japan '213 are also much larger than the ranges of the present invention, and Japan '213 requires the use of copper. As Japan '213 does not recognize or profess to solve the problem of the current invention, does not disclose a temperature range or a method of application, it is unlikely that Japan '213 would be used to create a plastic aluminum alloy coating.

Due to the fact that Japan '213, Gierrek, and Rallis fail to entirely disclose the specific elements or recognize the benefits of the current invention, persons skilled in the art reviewing these references would not have arrived at the current invention, nor would they have expected the superior results achieved by the currently claimed invention. Because none of the cited prior art references recognize the advantages of the current invention, and since these references either do not recognize the problem of brittle aluminum coatings or admit to not solving this problem, the results of the present invention could only have been achieved using impermissible hindsight. The mere fact that the cited references disclose aluminum alloy coatings does not make it obvious to one skilled in the art to combine these references to solve a problem they the references either do not address or admit to not solving.

#### NEW CLAIMS:

Claims 2-5 are new. Regarding claim 2, it is noted that none of the cited prior art references exclude copper from the aluminum alloy and Japan '213 specifically requires its presence. It is further noted that none of the cited prior art disclose a plastic aluminum alloy coating that achieve a Mandel test of 10 mm, as demonstrated by Table 1 of the specification.

Regarding claim 3, it is noted that none of the prior art disclose a plastic aluminum alloy coating. Furthermore Japan '213 does not disclose an amount of time for the product to be in the melt, and Gierrek discloses minimum melt times in excess of 5 minutes.

Regarding claim 4, none of the cited prior art do not require pre-heating, with the exception of Japan '213 which does not disclose a process for applying an aluminum alloy coating, but merely an aluminum alloy. Furthermore, as mentioned above, none of the cited prior art disclose a plastic aluminum alloy coating.

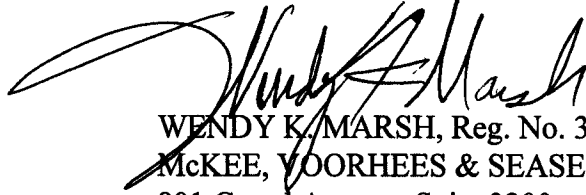
Regarding claim 5, none of the cited prior art disclose that the aluminum alloy coating is plastic. Furthermore, none of the cited prior art disclose that the coating is of a level of plasticity that it can pass a 10 mm mandrel test. As this feature is a primary object of the current invention, and as this feature begins to decay as temperatures move out of the temperature limits of the current invention and into the broad temperature limits of the cited prior art, the cited prior art is unable to meet this limitation with their disclosed temperature ranges. One skilled in the art would not be enabled to optimize the temperature ranges of Rallis or Gierak to achieve the plasticity of the present invention.

## CONCLUSION

This is a request under the provision of 37 CFR § 1.136(a) to extend the period for filing a response in the above-identified application for two months from June 16, 2007 to August 16, 2007. Applicant is a small entity; therefore, please charge Deposit Account number 26-0084 in the amount of \$225.00 to cover the cost of the two-month extension. Any deficiency or overpayment should be charged or credited to Deposit Account 26-0084. No other fees or extensions of time are believed to be due in connection with this amendment; however, consider this a request for any extension inadvertently omitted, and charge any additional fees to Deposit Account No. 26-0084.

Reconsideration and allowance is respectfully requested.

Respectfully submitted,

A handwritten signature in black ink, appearing to read "Wendy K. Marsh". The signature is fluid and cursive, with a large, sweeping initial "W".

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